LUYAO LIU

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EDUCATION

East China Normal University | Master of Physical Chemistry, *colloidal crystal* 2021.9- Present

East China Normal University | Bachelor of Chemistry 2017.9- 2021.6

REAERACH EXPERIENCES

Use PU to decorate fabrics for construct structural color fabrics with high crystallization 2023.2-Now

- **Highlights:** Construct high intensity photonic color fabrics on satin and sateen polyethylene terephthalate fabrics; PU film weaken capillary force and guide silica particles' assembly on the up layer of fabrics through wrapping the fiber of the yarn in polyester fabrics with low dosage PU decoration; Up layer photonic crystal provides high intensity structural color using less silica particles
- **My Role:** Responsible for designing and conducting experiments, data analysis, and academic writing

Green synthesis of structural colored fabrics by spraying aqueous colloidal solutions 2022.7-2023.1

- **Highlight:** Develop a one-step spraying method using an aqueous solution of SiO_2 particles to prepare SiO_2/PET fabrics with saturated and uniform structural colors.
- **My Role:** Responsible for designing and conducting experiments, data analysis, and academic writing

Precise Assembly of Highly Crystalline Colloidal Photonic Crystals inside the Polyester Yarns 2023.7

- **Highlights**: Develop spray coating synthesis for breathable and durable fabrics with saturated structural colors as the precise colloidal assembly in the yarn avoids the blocking of weaving holes and cracks.; High surface tension and high boiling point for the solvent of colloidal solution, as well as low twist angle, large weave cycles, and large tightness for the fabric substrate, are found to be favorable to the formation of high-quality PC-modified fabrics.
- **My Role:** Responsible for conducting part of the experiment, and data analysis

Nitrogen and sulfur-enriched porous bithiophene-melamine covalent organic polymers for effective capture of CO_2 and iodine 2020-10

- **Highlights:** Low-cost bithiophene and melamine were constructed into a new nitrogen and sulfur-enriched organic framework (TPFM) by one-pot Shiff-base type reaction without any catalysts and post-treatment procedure; Pore channels with abundant -NH groups on TPFM presents efficient carbon dioxide adsorption capacity with 77.5 $cm^3 \cdot g^{-1}$ (about 16 wt%) at 273 K; The donated lone pair electrons in S and N atoms on TPFM contributed to its fast and efficient iodine adsorption capacities of 293.3 $mg \cdot g^{-1}$ in cyclohexane solution.
- **My Role:** Responsible for designing and conducting experiments, data analysis, and academic writing

Multifunctional N-S doped porous carbon material derived from melamine thiophene 2019-10

- **Highlights:** Using thiophene formaldehyde and melamine as raw materials, prepare a nitrogen-sulfur co-doped porous carbon material by thermal conversion, and improve the material properties through metal coordination optimization to obtain N and S element doping of COF skeleton, conduct a highly active electrocatalyst that is modified without the metal.
- **My Role:** Responsible for designing and conducting experiments, data analysis, and academic writing

Ultrafine Cu6Sn5 nanoalloys supported on nitrogen and sulfur-doped carbons as robust electrode materials for oxygen reduction and Li-ion battery

- **Highlights:** Cu6Sn5@S-N-C displayed efficient ORR performance and unexpected durability in both basic and acidic electrolytes; Cu6Sn5@N-S-C gave the electrochemical lithium ion storage capacity of 905 mA h g-1 in an initial discharge.
- **My Role:** Responsible for conducting part of the experiment, and data analysis

Sn(OH)x-assisted synthesis of mesoporous Mn-porphyrinic frameworks and their carbon derivatives for electrocatalysis

- **Highlights:** 5,10,15,20-Tetrakis (4-aminophenyl) Mn-porphyrin and 2,4,6-trihydroxy-1,3,5-benzenetricarbaldehyde were combined into a new mesoporous organic framework by a Schiff-base-type reaction. Specimen was catalyzed for oxygen electroreduction in both alkaline and acidic media. Half-wave potential reached 0.86 V in 0.1 M KOH, with a very low yield of HO2− (4.02%) and better durability.
- **My Role:** Responsible for conducting part of the experiment, and data analysis

PUBILCATIONS

- Green synthesis of structural colored fabrics by spraying aqueous colloidal solutions — 2023.2
  Liu Luyao, *He Yuying, Fu Qianqian, Ge Jianping**
  Journal of East China Normal University (Natural Science)
- Precise Assembly of Highly Crystalline Colloidal Photonic Crystals inside the Polyester Yarns: A Spray Coating Synthesis for Breathable and Durable Fabrics with Saturated Structural Colors — 2022.7
  Yuying He, ***Luyao Liu,*** *Qianqian Fu, Jianping Ge**
  Advanced Functional Materials
- Nitrogen and sulfur-enriched porous bithiophene-melamine covalent organic polymers for effective capture of CO_2 and iodine — 2020.10
  Luyao Liu, *Chunmei Song* and Aiguo Kong**
  Material Letters
- Ultrafine Cu6Sn5 nanoalloys supported on nitrogen and sulfur-doped carbons as robust electrode materials for oxygen reduction and Li-ion battery — 2020.5
  Xiaoying Zhang, ***Luyao Liu****, Jiaxin Liu, Tingting Cheng, Aiguo Kong,* Yu Qiao, Yongkui Shan**
  Journal of Alloys and Compounds
- Sn(OH)x-assisted synthesis of mesoporous Mn-porphyrinic frameworks and their carbon derivatives for electrocatalysis — 2019.10
  Xiaoying Zhang, ***Luyao Liu****, Yu Qiao, Jiaxin Liu, Aiguo Kong* and Yongkui Shan**
  Dalton Transactions

EXTRA ACTIVITIES

Asian Universities Student Entrepreneurship Ideation Challenge (AUSEIC) Competition — Shanghai 2021.12

- **Description:** We focus on education backward areas, provide a combination of online and offline education resource assistance model, and are committed to breaking the problem of educational information barriers in poor areas
- **Achievement:** Won the second prize of the East China Normal University internal selection competition

VOLUNTEER WORKS

Miaomiao Reading Instruction Activities in Maqiao Experimental School — Shanghai 2019.10

- **Description:** Guide students to read children's picture books and talk about some extra knowledge about stories to broaden their perspectives and to inspire their interests

Tianjie Community Volunteer — Shanghai 2019.9

- **Description:** Accompany primary school students to solve learning problems, whose parents have low educational backgrounds and are migrant workers, and these parents do not have time to accompany their children to solve educational problems

Education Helps Social Practice Activities — Shanghai 2017.8

- **Description:** Accompany middle school students in areas with backward science and technology and backward educational resources, and carry out extracurricular interest activity groups for them, and provide interest activity groups such as aerobics, modular programming, board games, and stage plays

AWARDS

- The First Prize of ECNU Elite Class Scholarship (TOP 5%) — 2020.11
- The Third Prize Scholarship of ECNU (TOP 25%) — 2020.11
- National Encouragement Scholarship (Top 13%) — 2019.11
- The First Prize of ECNU Elite Class Scholarship (TOP 5%) — 2019.11
- The First Prize Scholarship of ECNU (TOP 10%) — 2018.11

SKILLS&HOBBIES

- Language Skills: English (TOEFL 88, Speaking 23, Aug.2023), Mandarin (Native) — 2020.11
- Tools: Origin, 3DMax, C4D, PS, Pr, Git — 2020.11
- Hobbies: Jogging, Baking, Watching Formula 1 Grand Prix and documentaries — 2019.11